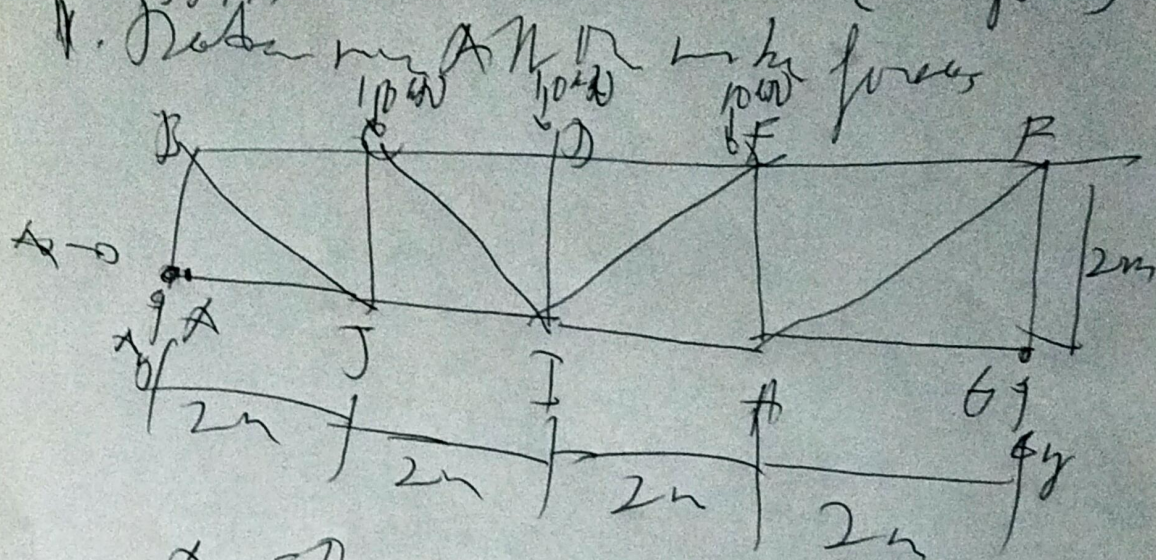


LKSRM knowledge check
 method of joints and sections
 Daniel Kenneth Villanueva (mids 2015)
 1838775



$$A_x = 0$$

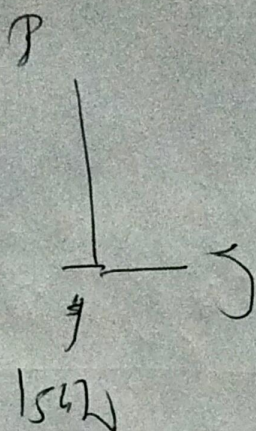
$$M @ A_y = 0; \rightarrow$$

$$10(2) + 10(4) + 10(6) - G_f(8) = 0$$

$$G_f = 15 \text{ kN}$$

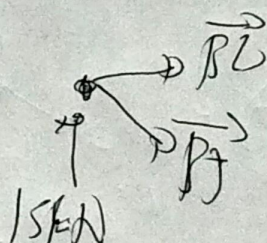
$$A_y = 15 \text{ kN}$$

Joint A:



$$A_B = 15 \text{ kN (C)}$$

Joint B:



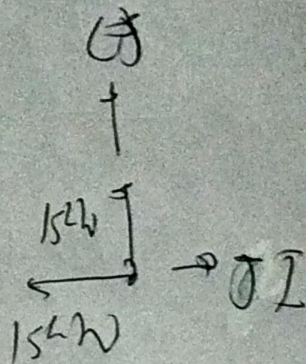
$$\cos 45^\circ = \sin 45^\circ = \frac{\sqrt{2}}{2}$$

$\sum F_y = 0$:

$$15 \text{ kN} - B_J \frac{\sqrt{2}}{2} = 0 \quad \therefore B_J = 21.21 \text{ kN (T)}$$

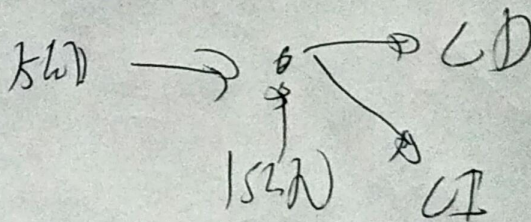
$$B_J \frac{\sqrt{2}}{2} = B_L \quad \therefore B_L = 15 \text{ kN (C)}$$

Q7. J:



$$\begin{aligned} \sum F_x &= 15 \text{ kN} (+) \\ \sum M &= 15 \text{ kNm} (+) \end{aligned}$$

Q7. L:



~~Q7. L:~~

$\sum F_y = 0$:

$$15 \text{ kN} - CI \frac{\sqrt{2}}{2} = 0 \quad \left[CI = 21.21 \text{ kN} (+) \right]$$

$\sum F_x = 0$:

$$15 \text{ kN} + CI + 21.21 \frac{15 \text{ kN}}{21.21} = 0$$

$$CI = -30 \text{ kN}$$

$$CI = 30 \text{ kN} (-)$$

$$D E = 30 \text{ kN} (C)$$

$$F I = 21.21 \text{ kN} (T)$$

$$H I = 15 \text{ kN} (T)$$

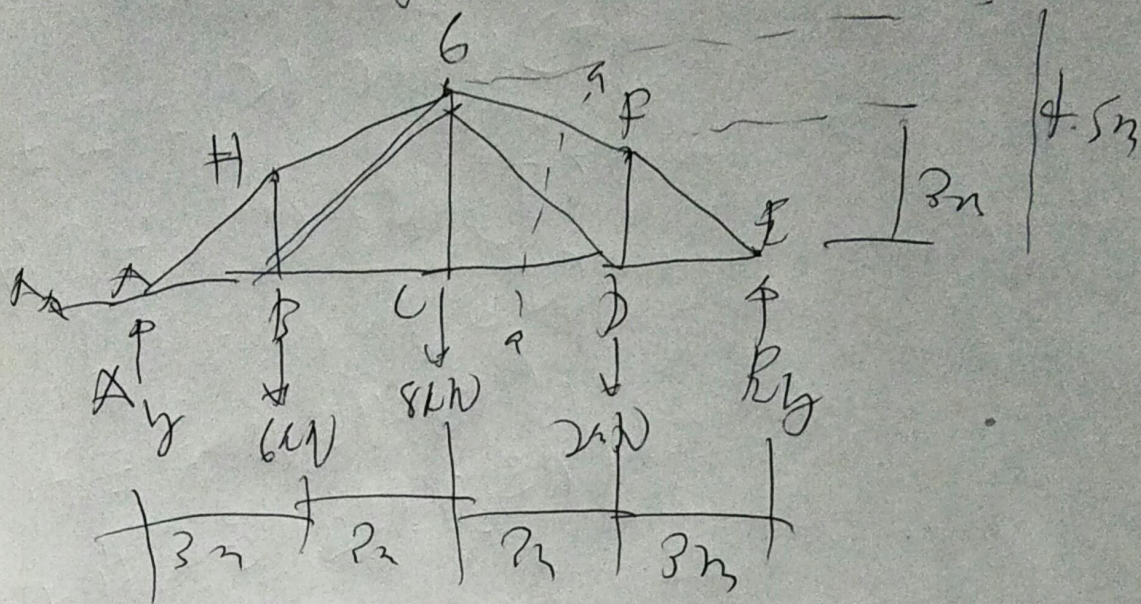
$$J K = 15 \text{ kN} (C)$$

$$K L = 15 \text{ kN} (C)$$

$$F H = 21.21 \text{ kN} (T)$$

$$P G = 15 \text{ kN} (C)$$

2. Determine reaction force D
(method of sections)



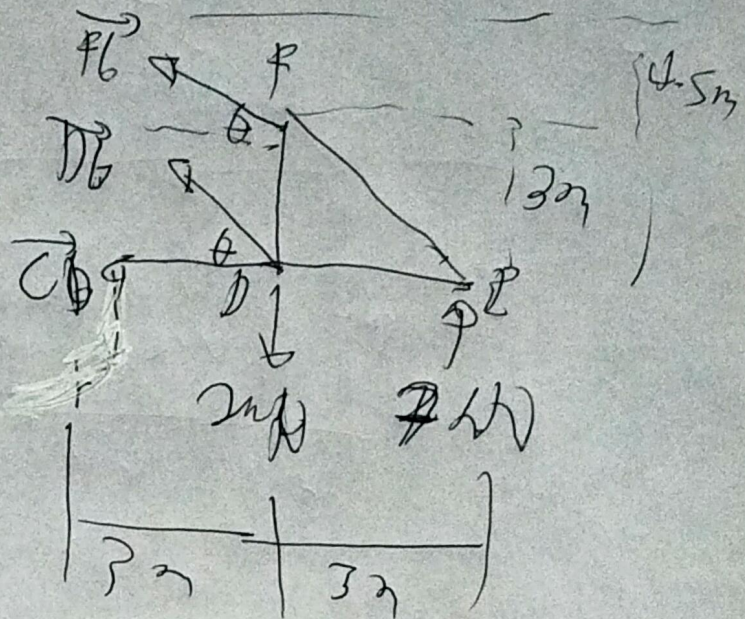
$$\sum M @ A = 0 : \uparrow +$$

$$6(3) + 8(6) + 2(9) - E_y(12) = 0$$

$$\therefore E_y = 7 \text{ kN}$$

$$A_y = 9 \text{ kN}$$

Section 4-4



$$\theta_{F6} = \tan^{-1} \left(\frac{(4.5-3)}{3} \right) = 26.57^\circ$$

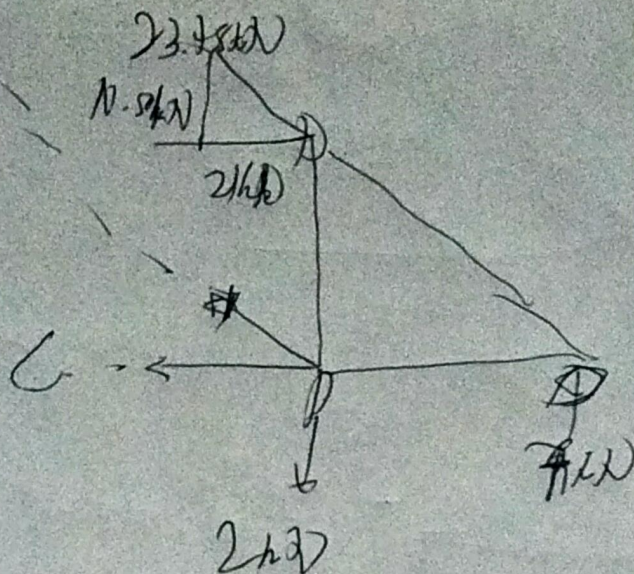
$$\theta_{D6} = \tan^{-1} \left(\frac{2}{3} \right) = 45^\circ$$

Method:

$$F6 \cos \theta_{F6} + 7 \text{ kN} (3 \text{ m}) = 0$$

$$F6 = 23.48 \text{ kN} = -23.48$$

6.


 $\sum F_y = 0:$

$$-10.45 \text{ kN} + D_B \sin 45^\circ - 2 \text{ kN} + 7 \text{ kN} = 0$$

$$\cancel{D_B = 7.71 \text{ kN (T)}}$$

~~(*)~~

$$D_B = 7.71 \text{ kN (T)}$$

 $\sum F_x = 0:$

$$D_C + 21 + D_B \cos 45^\circ = 0$$

$$\cancel{D_C = -26.45 \text{ kN (C)}}$$

$$D_C = 26.45 \text{ kN (C)}$$

 $\sum F_y = 0:$

$$-10.45 + 7.71 \sin 45^\circ - 2 \text{ kN} + 7 \text{ kN} = 0.6018$$